

BASELINE EVALUATION OF THE UTILIZATION AND COST PATTERNS OF COMPOUNDED DRUGS



TEXAS DEPARTMENT OF INSURANCE
WORKERS' COMPENSATION
RESEARCH AND EVALUATION GROUP

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Executive Summary

This report evaluates the utilization and cost patterns of compounded drugs dispensed in the Texas workers' compensation system. Compounding is a process where a pharmacist or a physician combines, mixes, or alters ingredients to meet specific needs of a patient, as an alternative to commercially available manufactured drugs. Compounding is a part of traditional pharmacy practice, but there is scant data on the number, type, and nature of compounded drugs. This report is the first extensive evaluation of the compounded drugs regarding their prevalence, costs, components, and utilization patterns by timing, "N" drug status, network status and geographic area.

Pharmacy service providers are required to report and bill ingredients of a compounded drug prescription as separate billing lines, but the billing data does not indicate whether one is a compounded drug or not. For this report, a prescription is identified as a compounded drug if component bill lines contain bulk chemicals, pharmaceutical adjuvants, or powder-form of common ingredients of nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants.

NUMBER AND COST OF COMPOUNDED DRUGS

- ★ The number of compounded drugs increased from 18,020 prescriptions in 2010 (1.6 percent of total pharmacy prescriptions) to 26,380 in 2014 (3.2 percent of total). Since 2014, it decreased steadily to 20,751 in 2016 while their share of the total pharmacy prescriptions remained at 3.2 percent.
- ★ In 2010, the total cost of compounded drugs was \$6 million (4 percent of the total pharmacy cost of \$152 million), which increased to \$12 million in 2014 (12.5 percent of the total \$112 million). In 2016, the total cost decreased to \$11 million (11 percent of the total \$98 million).
- ★ The average cost of compounded drug prescription was \$356 in 2010, which increased to \$829 in 2016 (a 133 percent increase).

COMPOUNDED DRUGS BY CLAIM

- ★ In 2016, 3,048 claims received one or more compounded drugs. This represented 2.5 percent of the pharmacy claims.
- ★ Per-claim cost of compounded drugs increased from \$1,993 in 2010 to \$5,936 in 2016 (198 percent increase). This increase was mainly due to increases in the average cost per compounded drug prescription. The number of prescriptions per claim increased slightly since 2013.
- ★ Among the claims receiving compounded drugs, 88 percent were lost-time claims in 2016.
- ★ The most common type of injury among the claims receiving compounded drugs was back injury (31 percent of the claims in 2014).

COMPOUNDED DRUGS BY INJURY YEAR

- ★ The average number of compounded drugs per claim, at 6 months after injury, was at its lowest in Injury Year (IY) 2013 at 3 prescriptions per claim, which increased to 4.3 prescription per claim in IY 2015. At 12 months after injury, the average number of compounded drugs per claim was 6 prescriptions per claim in IY 2015.
- ★ The share of claims receiving compounded drugs at 6 months of maturity increased from 0.7 percent in IY 2010 to 1.1 percent in IY 2015. The average cost of compounded drugs per claim at 6 months of maturity increased by 347 percent from IY 2010 to IY 2015 (from \$958 to \$4,760).
- ★ About 54 percent of the IY 2014 claims (with 24 months of maturity) received compounded drugs on more than one service dates.
- ★ About 40 percent of the IY 2014 claims (with 24 months of maturity) received compounded drugs within the first 3 months after injury. Another 23 percent received compounded drugs within 6 months. Among those receiving compounded drugs within 3 months after injury, 40 percent of those claims received compounded drugs without using any other prior drugs.
- ★ Among IY 2014 claims (with 24 months of maturity) receiving multiple compounded drugs, the use of compounded drugs lasted for 0 to 3 months in 51 percent of the claims; 22 percent lasted 3 to 6 months; and 27 percent lasted for more than 6 months.

BASE AND ACTIVE INGREDIENTS OF COMPOUNDED DRUGS

- ★ Most common base ingredients were those used to prepare cream-based topical applications (Pluronic Lecithin Organogel bases).
- ★ The use of manufactured and expensive proprietary bases increased significantly. In 2010, 5.3 percent of the compounded drug prescriptions contained proprietary bases, and they accounted for 35 percent of the base cost. In 2016, about 45 percent of the prescriptions contained proprietary bases, and these accounted for 86 percent of the total base cost.
- ★ In 2016, Baclofen was the most common active ingredient in compounded drugs, followed by Gabapentin, Cyclobenzaprine, and Flurbiprofen.
- ★ The per-prescription cost of Cyclobenzaprine and Baclofen decreased by 27 percent and 24 percent, respectively, while the average cost of Gabapentin and Flurbiprofen increased by 61 percent and 31 percent, respectively. Compounded drugs in 2016 contained more active ingredients per prescription than in 2010, contributing to the increasing cost per prescription.

PHARMACY CLOSED FORMULARY, COMPOUNDED DRUGS, AND OPIOIDS

- ★ The pharmacy closed formulary requires preauthorization if a compounded drug contains any of the status “N” drug. However, there is some difficulty in verifying “N” drug status for powder-form ingredients. Estimates based on drug names showed that about 38 percent of the compounded drug prescriptions contained one or more “N” drugs in 2010. After the closed formulary, “N” drug share decreased to about 10 percent by 2016.
- ★ In 2010, about 6 percent of the compounded drug prescriptions contained opioids. In 2016, 10 percent of the prescriptions contained opioids. Tramadol was the common opioids in compounded drugs.

NETWORK STATUS AND COMPOUNDED DRUGS

- ★ In 2014, 2.1 percent of the network claims received compounded drugs, compared to 4.2 percent in non-network claims.

DISPENSING PHARMACIES, PRESCRIBERS, AND INSURANCE CARRIERS OF COMPOUNDED DRUGS

- ★ The top 5 dispensing pharmacies (in terms of number of prescriptions) accounted for 86 percent of all compounded drugs in 2016. This was an increase from 73 percent in 2010.
- ★ The top 10 prescribing providers (in terms of number of prescriptions) in 2016 accounted for 55 percent of all compounded drug prescriptions. On average, each of the top 10 prescribers provided more than 1,000 prescription a year. The top 20 prescribing providers accounted for 68 percent of all prescriptions.
- ★ Top 10 insurance carriers accounted for 80 percent of the compounded drugs. Average cost per prescription ranged from \$371 to \$1,224 per carrier. Among the top 10 carriers, the share of compounded drugs in all pharmacy differed significantly: from a high of 9.3 percent to a low of 1.3 percent.

COMPOUNDED DRUGS BY GEOGRAPHICAL AREAS

- ★ Houston HRR alone accounted for 67 percent of all compounded drugs in 2016 while it accounted for 24 percent of all pharmacy prescriptions. 47 percent of the claims receiving compounded drugs are from Houston HRR while Houston HRR accounted for 22 percent of all pharmacy claims.
- ★ 5.4 percent of the claims in Houston HRR received one or more compounded drugs in 2016, being the highest among the five large metro areas. The second highest was Dallas HRR with 2.3 percent.

1. INTRODUCTION

Compounding is a process where a pharmacist or a physician combines, mixes, or alters ingredients to meet specific needs of a patient, as an alternative to commercially available manufactured drugs. Such needs may arise because of potential allergic reactions by some ingredients, individual specific requirements for doses or routes of administration, or drug discontinuation and shortages. Compounding is a part of traditional pharmacy practice, but there is scant data on the number, type, and nature of compounded drugs.

This report evaluates the utilization and cost patterns of compounded drugs dispensed in the Texas workers' compensation system. We primarily use the pharmacy billing data collected by the Division of Workers' Compensation, Texas Department of Insurance. The use of compounded drugs in traditional compounding pharmacies is regulated by the state board of pharmacy. In the context of workers' compensation, there are three relevant rules that affect their use and reporting.

First, if a compounded drug contains any ingredient that is a status "N" drug in the pharmacy closed formulary, providers are required to obtain preauthorization. Second, providers are to follow recommendations of the evidence-based Official Disability Guidelines (ODG). ODG considers topical analgesics (the most common compounded drugs in the workers' compensation system) as "largely experimental," and compounded drugs containing any 'not recommended' (N-drug) ingredient may be subject to preauthorization. Third, individual ingredients of a compounded drug are to be billed separately. Despite this requirement, a substantial number of bills were submitted as a single line without specifying component ingredients. This requirement was reaffirmed in 2015. However, there is no data that indicates whether a prescription is a compounded drug or not.

IDENTIFICATION OF COMPOUNDED DRUGS

Compounded drugs are identified first by selecting bill lines that are (bulk) chemicals and pharmaceutical adjuvants using Groups 96 and 98 in the Medi-Span's Therapeutic Classification System (TCS). Using pharmacy bills from 2010 service year to 2016 service year, about 135,000 unique prescriptions (bill IDs) are identified in this first step.

Secondly, bill lines of powder-form drugs are used to identify potential compounded drugs because some bills do not include chemicals or adjuvants. About 72 percent of these bill lines are already associated with prescriptions identified in the first step.

Of the remaining 28 percent of the powder bill lines, 90 percent of these bill lines are either NSAIDs (TCS 66), muscle relaxants (TCS 75) or laxatives (TCS 46). Since powder forms of drugs are commonly used in compounded drugs, these powder bill lines are also used to identify compounded drugs. However, laxatives are excluded from the list because they are commonly in powder form, not for compounding, but for dissolving in water for oral administration. There are about 15,000 additional prescriptions

identified in this step. In the final dataset, there are 149,620 prescriptions that are identified as compounded drugs.

DEFINITION OF TERMS

A prescription is identified by a unique bill identification number. In this report, ‘a prescription’ and ‘a bill’ refer to the same thing—an instance of a compounded drug.

A prescription may have one or more associated bill lines. ‘Bill lines’ are individual ingredients in a prescription. ‘A bill line’ and ‘an ingredient’ are used interchangeably in this report. Most prescriptions, except for compounded drugs, have only one bill line.

In this report, the therapeutically inactive ingredients of a compounded drug are named ‘bases’, which include solvents, emulsifiers, excipients, bulking agents, cream bases, preservatives, and pharmaceutical adjuvants. These have few or no pharmacological effects by themselves, but may increase the efficacy or potency of other drugs. Other active pharmaceutical components are named as ‘active ingredients.’

2. NUMBER OF COMPOUNDED DRUGS

PRESCRIPTION LEVEL SUMMARY

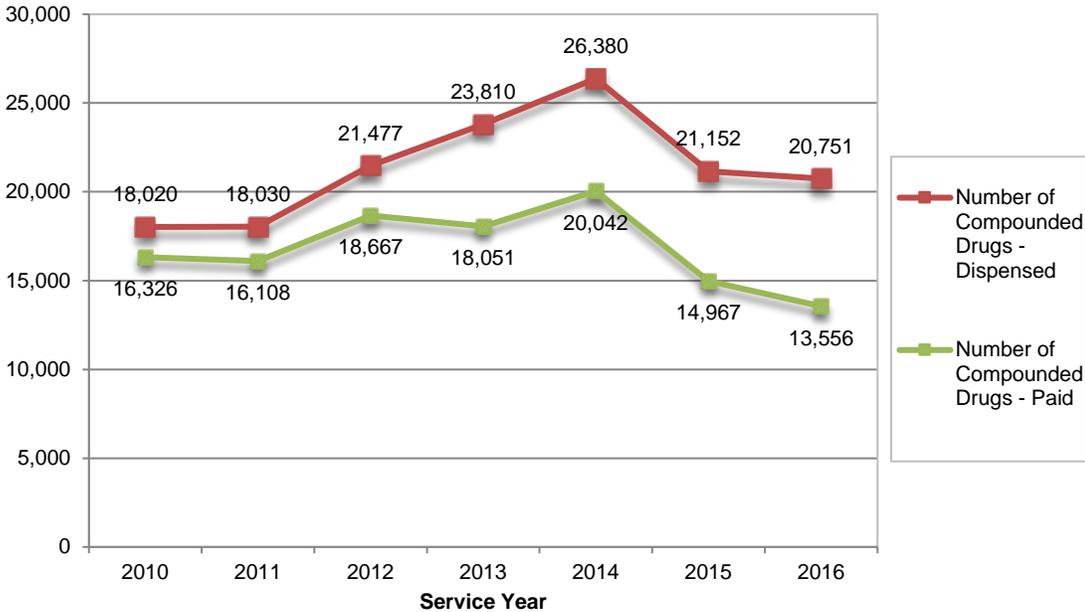
The total number of compounded drugs increased from 18,020 prescriptions (1.6 percent share of the total pharmacy prescriptions in 2010 to 20,751 prescriptions (3.2 percent of all prescriptions) in 2016 (see Table 1 and Figure 1). About 7,200 prescriptions (35 percent of the total) in 2016 were denied payment, resulting in 13,556 compounded drugs that were paid.

Table 1: Number of Compounded Drugs by Service Year

Service Year	Number of Compounded Drugs - Dispensed	Number of Compounded Drugs - Paid	Number of Rx in Pharmacy	Share of Compounded Drugs	Denied Compounded Drugs	Share of Denied
2010	18,020	16,326	1,133,618	1.6%	1,694	9.4%
2011	18,030	16,108	1,108,857	1.6%	1,922	10.7%
2012	21,477	18,667	998,932	2.1%	2,810	13.1%
2013	23,810	18,051	893,663	2.7%	5,759	24.2%
2014	26,380	20,042	819,111	3.2%	6,338	24.0%
2015	21,152	14,967	714,854	3.0%	6,185	29.2%
2016	20,751	13,556	651,811	3.2%	7,195	34.7%

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

Figure 1: Number of Compounded Drugs by Service Year



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

PAYMENT ADJUSTMENT REASONS

Utilization metrics in our analysis included all prescriptions regardless of whether they were paid or not by the payer. But cost metrics, such as an average cost per claim, were calculated with only those prescriptions that were not denied payment. In 2010, about 9 percent of the prescriptions were denied payment, while in 2016, about 35 percent of the prescriptions were denied payment (see Table 1).

The number of prescriptions with denied payments and the reasons for denial varied over the years (see Table 2). In 2010, the most common denial reason was claim adjustment reason code (CARC) 29 (time limit for filing expired). In 2016, the most common CARC code was 197 (a lack of precertification, preauthorization, or notification).

Denials based on a lack of medical necessity (CARC 50) accounted for 16 percent of all denied bills in 2010, which decreased slightly to 13 percent in 2016. Most other denial reasons are administrative denials.

Table 2: Eight Most Common Payment Adjustment Reasons for Denied Compounded Drugs

Service Year	Number of Denied Rx	Total Associated Bill Lines	Payment Adjustment Reasons								Share of 8 Codes in Total Bill Lines
			197	16	216	W3	50	29	W1/P12	45	
2010	1,694	6,352	313	189	510	6	988	1,674	301	12	62.9%
2011	1,922	7,840	368	175	711	62	1,342	2,276	334	769	77.0%
2012	2,810	12,372	1,277	1,354	1,690	76	2,698	2,217	490	37	79.5%
2013	5,759	21,686	6,040	4,248	1,317	1,096	1,507	2,366	835	505	82.6%
2014	6,338	27,251	9,909	951	2,934	2,953	1,144	2,204	2,178	1,300	86.5%
2015	6,185	31,376	10,024	2,137	3,626	2,282	2,636	2,098	1,532	1,720	83.0%
2016	7,195	31,875	8,941	2,116	6,386	1,276	4,191	879	1,015	1,256	81.8%

Note: Denial codes (Claim Adjustment Reason Codes) are as follows:

- 197 Precertification/authorization/notification absent
- 16 Lack information/billing error
- 216 Based on findings of a review organization
- W3 Adjustment on Appeal/reconsideration
- 50 Not deemed a medical necessity by the payer
- 29 Time limit for filing expired
- W1/P12 Fee schedule adjustment
- 45 Exceed fee schedule/maximum allowed

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

BILL LINE (INGREDIENT) LEVEL SUMMARY

On average a compounded drug prescription consisted of 3.7 bill lines in 2016 as there were 77,375 associated bill lines of 20,751 compounded drug prescriptions (see Table 3). Compounded drugs accounted for 9 percent of all pharmacy bill lines in 2016, increasing from 3.5 percent of all lines in 2010.

Bill lines (ingredients) are either (1) active ingredients ('actives'), (2) solvents, emulsifiers, surfactants, cream bases, liquid vehicles, and other chemicals and excipients that are added to active ingredients in a compounding formula ('bases'), or (3) unidentified billing lines. Unidentified billing lines were mostly charges for compounding fees. We will examine bases and active ingredients in more detail in Sections 6 and 7.

In the Texas workers' compensation system, payers are required to report compounded drugs at the ingredient level, which implies that a bill for a compounded drug prescription should contain more than one bill lines. However, in 2016, 3,210 prescriptions (about 16 percent of the compounded drug prescriptions) were single-line bills (see Table 3). Nevertheless, the practice of reporting compounded drugs as single-line bills decreased significantly. In 2010, the share of single-line bills was 52 percent of the total. After examining the contents of these single-line bills, it was determined that they were mostly reporting one main ingredient of the compounded drug, and therefore these are included in our analysis. Excluding single-line bills, the average number of bill lines per prescription was slightly higher at 4.2 lines per prescription in 2016.

Table 3: Associated Bill Lines of Compounded Drug Prescriptions

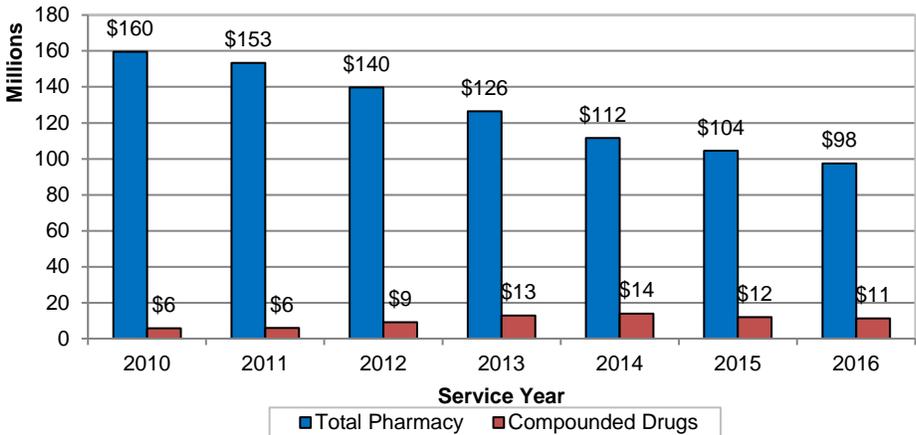
Service Year	Number of Compounded Drugs	Associated Bill Lines	Bill Lines per Compounded Drug Prescription	Total Pharmacy Bill Lines	Share of Compounded Drug Bill Lines	Number of Single-line Prescriptions
2010	18,020	55,426	3.1	1,568,241	3.5%	9,274
2011	18,030	61,694	3.4	1,516,924	4.1%	8,819
2012	21,477	79,906	3.7	1,362,964	5.9%	8,958
2013	23,810	80,539	3.4	1,221,165	6.6%	9,421
2014	26,380	94,639	3.6	1,114,731	8.5%	7,717
2015	21,152	87,452	4.1	955,776	9.1%	3,738
2016	20,751	77,375	3.7	859,797	9.0%	3,210

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

3. COST OF COMPOUNDED DRUGS

The total cost of compounded drugs in 2010 was about \$6 million, accounting for less than 4 percent of total pharmacy cost (see Figure 2). The total cost of pharmacy services decreased continuously and substantially since 2010 due in part to the implementation of the pharmacy closed formulary in 2011, but the cost of compounded drugs increased to \$11 million in 2016, accounting for 11 percent of the total pharmacy cost.

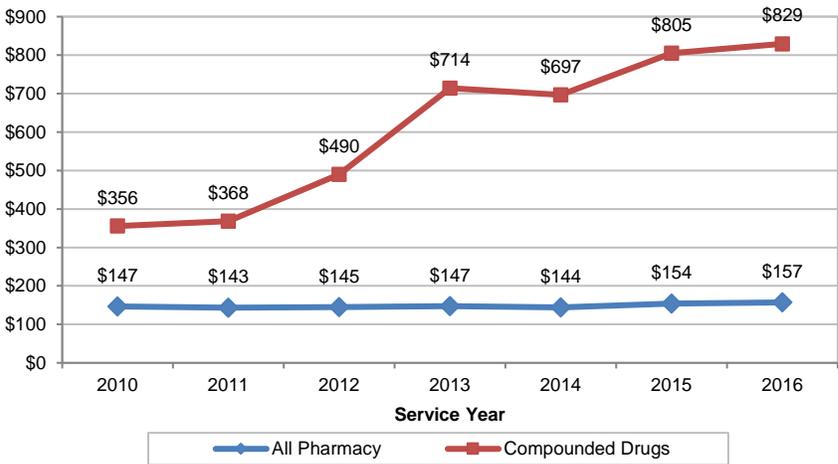
Figure 2: Total Cost of Compounded Drugs



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

The average cost of compounded drugs increased steadily since 2010 (see Figure 3). While the average cost of all drugs increased by 7 percent from \$147 in 2010 to \$157 in 2016, the average cost of compounded drug prescription increased by 133 percent from \$356 in 2010 to \$829 in 2016.

Figure 3: Average Costs of Compounded Drug Prescription and All Pharmacy

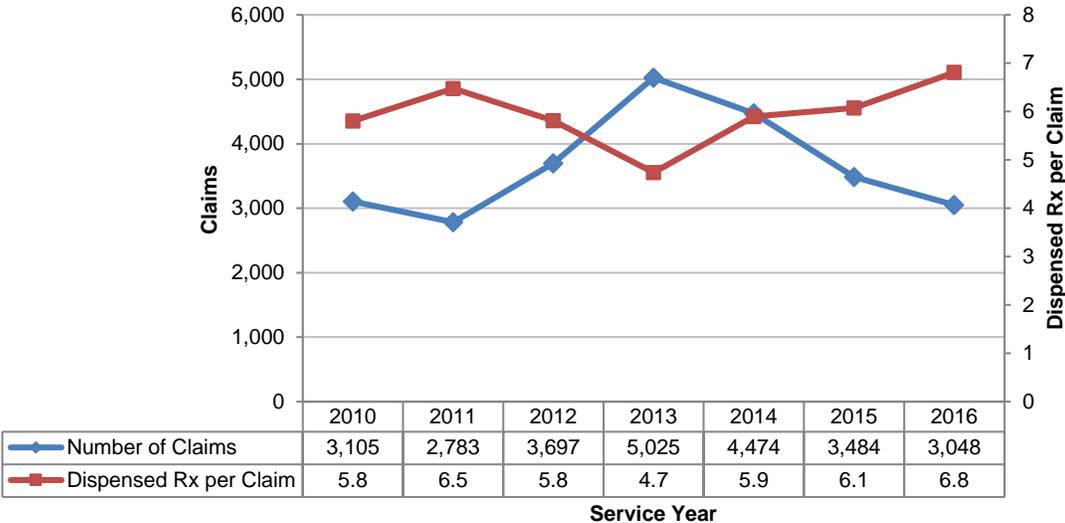


Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

4. COMPOUNDED DRUG UTILIZATION AND COST BY CLAIM

The number of claims receiving compounded drugs fluctuated, having peak years in 2013, and low years in 2010 and 2016 (see Figure 4). Each claim received about 6.8 prescriptions in 2016, a slight increase from 5.8 prescription per claim in 2010. The number of compounded drugs per claim increased when the total number of claims decreased, and vice versa.

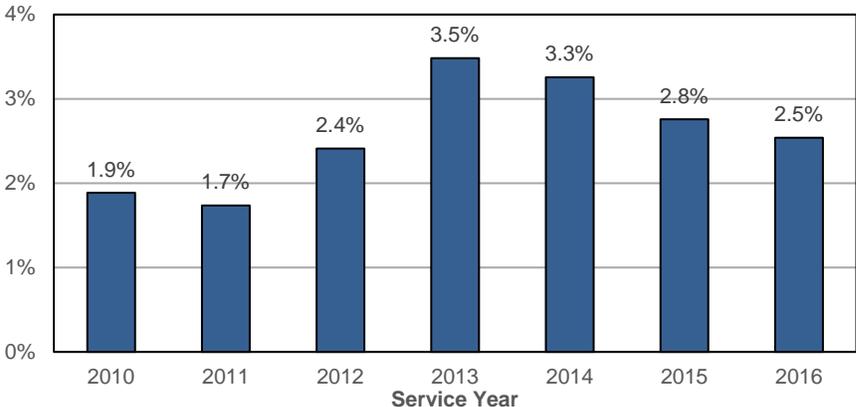
Figure 4: Number of Claims and Prescriptions per Claim



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

The percentage of claims receiving compounded drugs as a share of all pharmacy claims increased from 1.9 percent in 2010 to 3.5 percent in 2013. However, this share decreased to 2.5 percent by 2016 (see Figure 5).

Figure 5: Percentage Share of Claims Receiving Compounded Drugs in All Pharmacy Claims

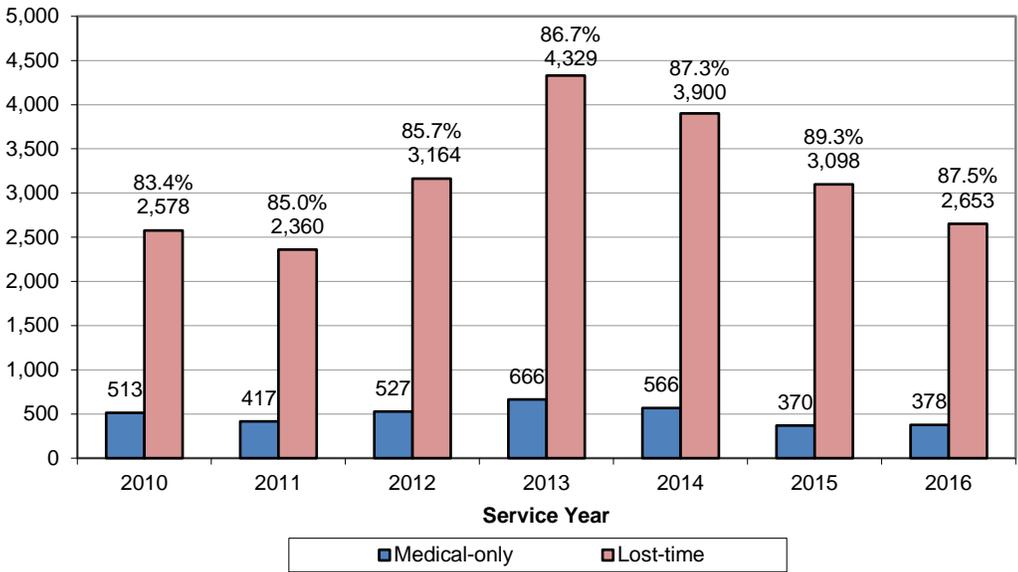


Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

COMPOUNDED DRUGS BY CLAIM TYPE

Claims receiving compounded drugs are mostly lost-time claims with more serious injuries than medical-only claims. In 2016, 3,031 claims received compounded drugs, and about 88 percent (2,653) of these claims were lost-time claims (see Figure 6). In the overall pharmacy services, about 54 percent of the claims were lost-time claims in 2015. The decrease since 2013 coincided with legacy claims being subject to the pharmacy closed formulary.

Figure 6: Number of Claims by Claim Type



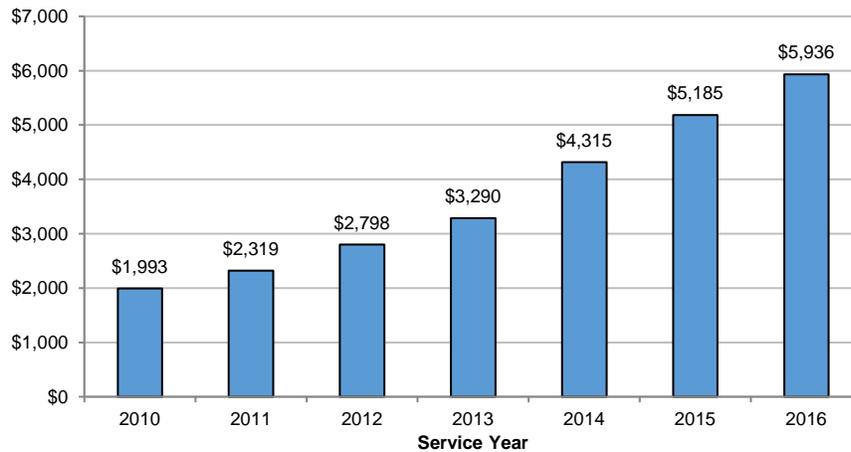
Note: Claims without claim type information are removed from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

PER-CLAIM COST OF COMPOUNDED DRUGS

The average cost of compounded drugs per claim by service year increased from \$1,993 in 2010 to \$5,936 in 2016, a 198 percent increase (see Figure 7). This increase is largely due to the significant increase in the per-prescription price of compounded drugs (as seen in Figure 3) and an increase in the number of compounded drug prescriptions per-claim (as seen in Figure 4).

Figure 7: Compounded Drug Cost per Claim by Service Year



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

COMPOUNDED DRUGS BY INJURY TYPE

For each claim, there are multiple diagnosis codes (ICD-9 codes) entered in various bills, partly because one’s diagnosis may change over time. To characterize each claim’s primary diagnosis code, we used the most costly code, and assigned an injury type based on the body part affected.

In 2014, claims receiving compounded drugs were largely back-injury claims, accounting for 31 percent of all claims with compounded drugs in 2014 (see Table 4 and Figure 8). In comparison, the share of back injuries in all medical claims was about 13 percent in 2014, with upper and lower extremity injuries accounting for 26 and 16 percent each, respectively.

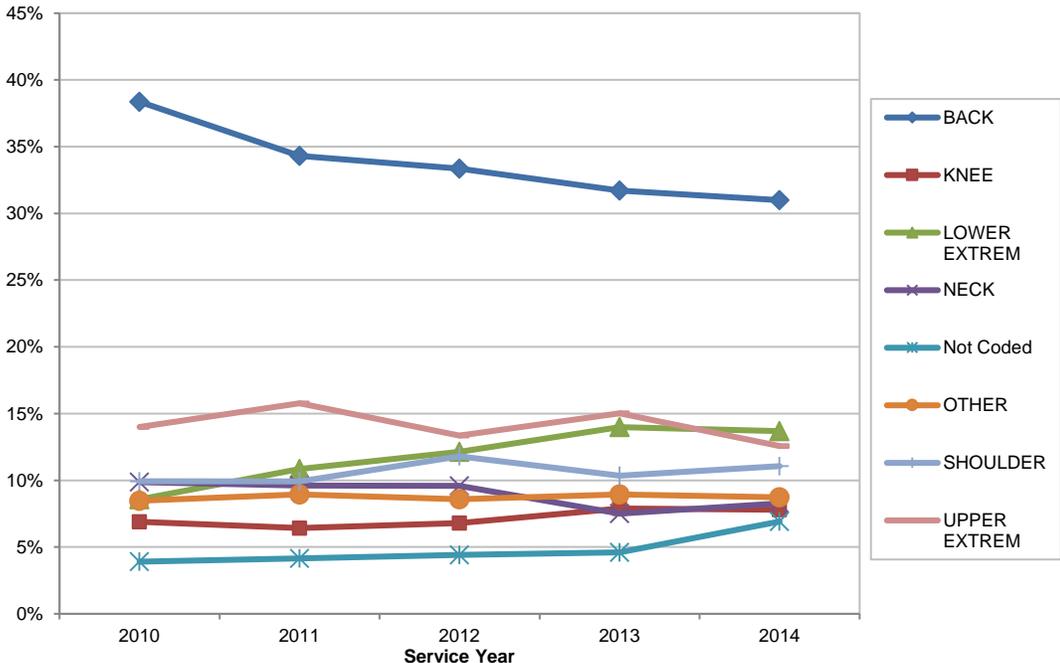
Table 4: Number of Claims by Injury Type by Service Year

Injury Type	2010	2011	2012	2013	2014	Total
BACK	1,159	940	1,218	1,576	1,376	6,269
KNEE	208	176	248	392	346	1,370
LOWER EXTREM	259	297	443	695	608	2,302
NECK	298	263	350	373	367	1,651
Not Coded	118	114	161	229	307	929
OTHER	256	245	314	444	387	1,646
SHOULDER	300	272	431	514	491	2,008
UPPER EXTREM	423	432	488	746	558	2,647
Total	3,021	2,739	3,653	4,969	4,440	18,822

Note: Numbers for 2015 and 2016 are not obtainable until a crosswalk between ICD-9 and ICD-10 codes becomes available. Claims without injury type information are removed from analysis.

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

Figure 8: Percent Share of Claims by Injury Type by Service Year



Note: Numbers for 2015 and 2016 are not obtainable until a crosswalk between ICD-9 and ICD-10 codes becomes available. Claims without injury type information are removed from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

5. UTILIZATION OF COMPOUNDED DRUGS BY INJURY YEAR

Injury year (IY) statistics consider only new claims in each year, and summarize pharmacy services up to a certain service date from the injury date, such as 6 months, 12 months, or 24 months from injury. Pharmacy services are dominated by legacy claims since workers' compensation claims continue to receive pharmacy services after several years from injury. Therefore, injury year statistics present a partial picture that excludes services for a substantial number of claims. Nevertheless, such statistics are useful when comparing pharmacy usage patterns among comparable claims within a comparable time period.

The number of claims receiving compounded drugs by injury year (see Table 5) shows a similar trend as the number by service year (as in Figure 4) with a peak in IY 2013 and a decrease since then. The number of compounded drug prescriptions by injury year at 6 months maturity peaked in IY 2014 and decreased slightly in IY 2015 (see Table 6). The average number of compounded drugs per claim was increasing from IY 2013 (see Figure 9).

Table 5: Number of Claims Receiving Compounded Drugs, by Injury Year at 6, 12, and 24 Months of Maturity

Injury Year	6 Months	12 Months	24 Months
2010	745	1,016	1,311
2011	772	1,159	1,673
2012	1,060	1,661	2,138
2013	1,409	1,918	2,301
2014	1,367	1,787	2,187
2015	938	1,355	

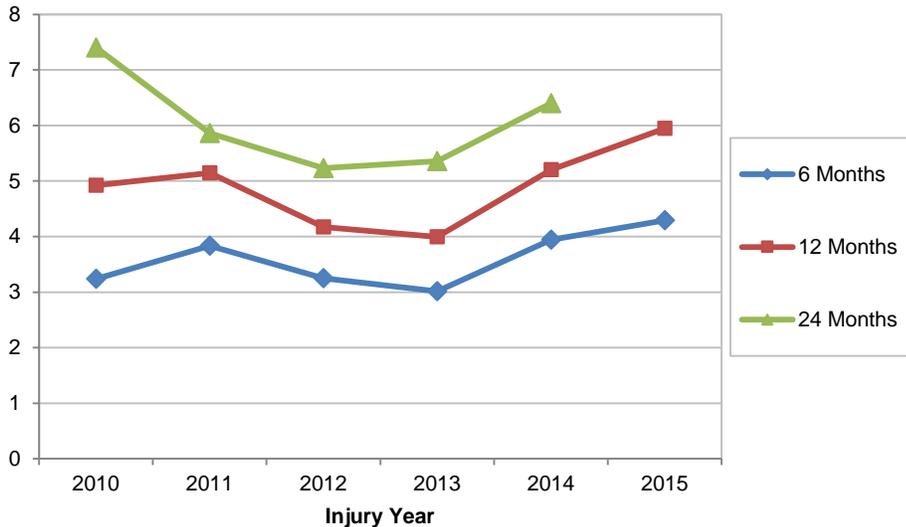
Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

Table 6: Number of Dispensed Compounded Drug Prescriptions, by Injury Year at 6, 12, and 24 Months of Maturity

Injury Year	6 Months	12 Months	24 Months
2010	2,414	5,003	9,708
2011	2,959	5,965	9,806
2012	3,444	6,932	11,188
2013	4,245	7,666	12,334
2014	5,391	9,295	14,002
2015	4,025	8,063	

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

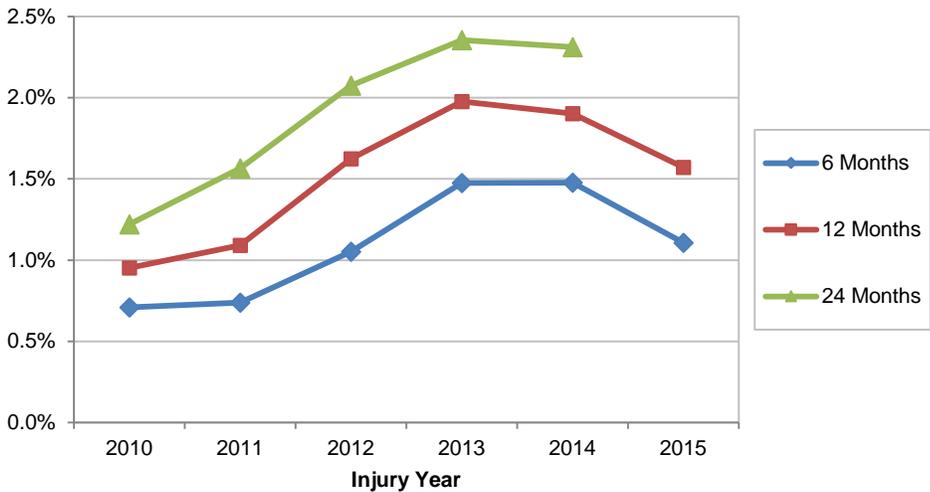
Figure 9: Average Number of Compounded Drugs per Claim, by Injury Year at 6, 12, and 24 Months of Maturity



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

The share of claims receiving compounded drugs with 6 months of maturity increased from 0.7 percent of all claims in IY 2010 to 1.5 percent in IY 2013, and then decreased to 1.1 percent in IY 2015 (see Figure 10). As maturity grows, this share increases expectedly.

Figure 10: Share of Claims Receiving Compounded Drugs, by Injury Year at 6, 12, and 24 Months of Maturity

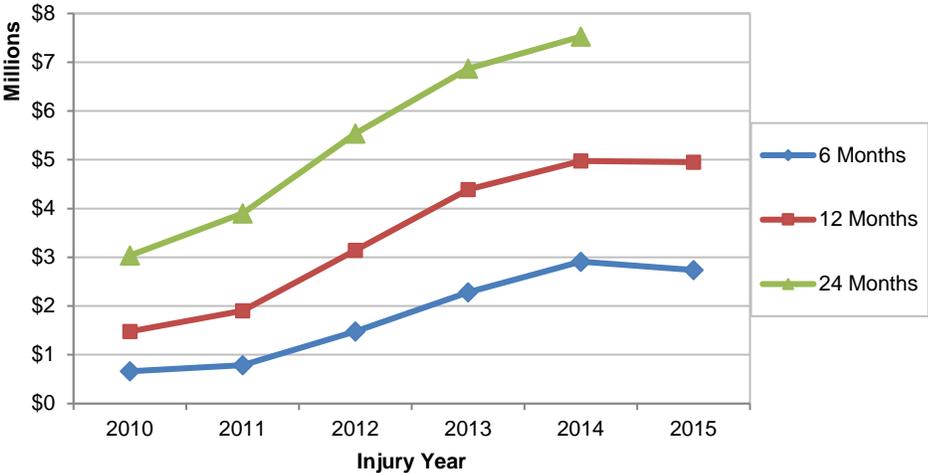


Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

COST OF COMPOUNDED DRUGS BY INJURY YEAR

Total cost of compounded drugs at 6 months of maturity increased by 313 percent from \$662,000 in IY 2010 to \$2.7 million in IY 2015 (see Figure 11). Total cost at 12 months of maturity increased by 235 percent during the same period.

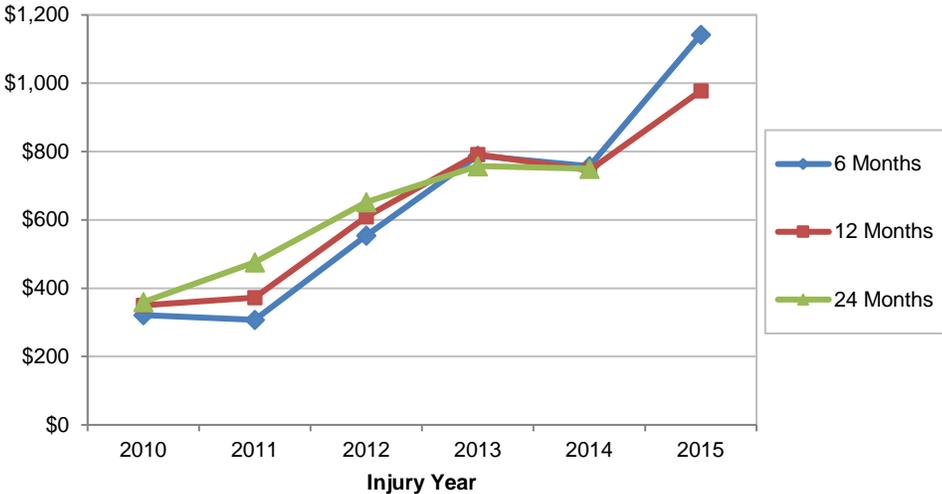
Figure 11: Total Cost of Compounded Drugs, by Injury Year at 6, 12, and 24 Months of Maturity



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

The average cost of compounded drug prescription at 6 months of maturity increased by 256 percent from IY 2010 to IY 2015 (see Figure 12). The average cost at 12 months of maturity increased by 179 percent.

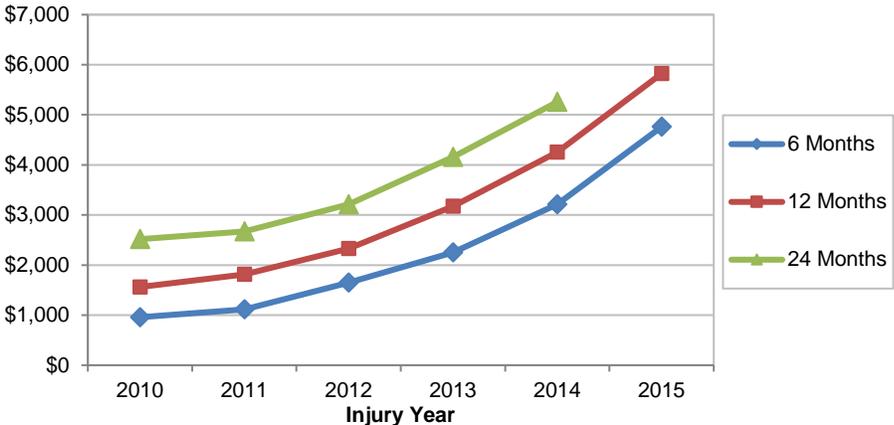
Figure 12: Average Cost of Compounded Drugs per Prescription, by Injury Year at 6, 12, and 24 Months of Maturity



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

The average cost per claim at 6 months of maturity increased by 397 percent, from \$958 in IY 2010 to \$4,760 in IY 2015 (see Figure 13). At 12 months of maturity, the average cost per claim increased by 273 percent, from \$1,562 to \$5,822 in the same time period.

Figure 13: Average Cost of Compounded Drugs per Claim by Injury Year at 6, 12, and 24 Months of Maturity

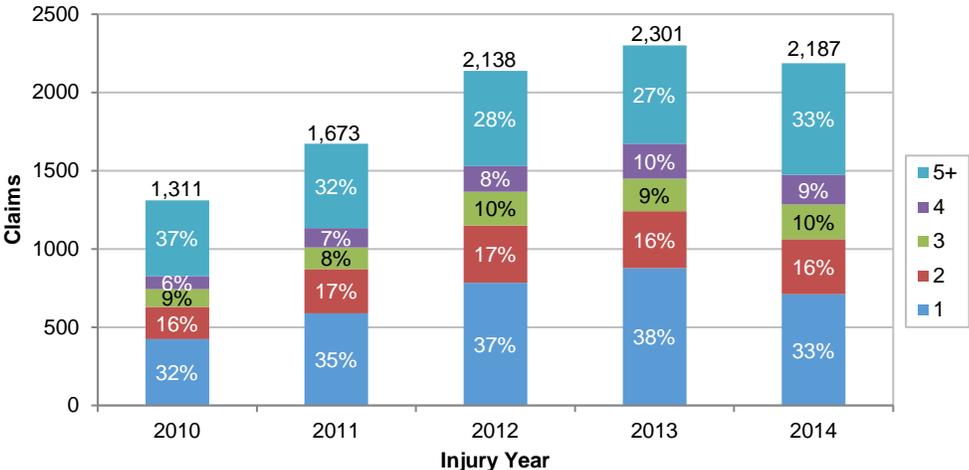


Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

COMPOUNDED DRUG UTILIZATION

About a third of the claims received only one compounded drug and another third received 5 or more prescriptions. Among 2,187 claims in IY 2014 with 24 months of maturity, 33 percent (711 claims) received only one compounded drug prescription (see Figure 14). The rest (1,476 claims) received two or more prescriptions within 24 months from injury.

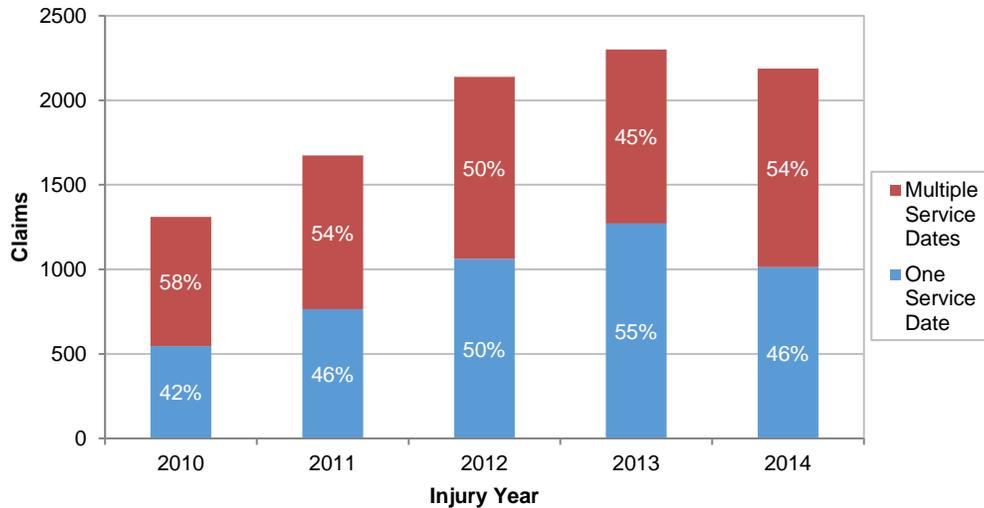
Figure 14: Number and Share of Claims by the Number of Compounded Drug Prescriptions, by Injury Year at 24 Months Maturity



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

In terms of service dates, about 46 percent of the claims in IY 2014 had only one service date (see Figure 15), which is higher than 33 percent with only one prescription. It indicates that some claims may have received multiple prescriptions on the same day.

Figure 15: Number of Service Dates for Compounded Drug Prescriptions, by Injury Year at 24 Months Maturity



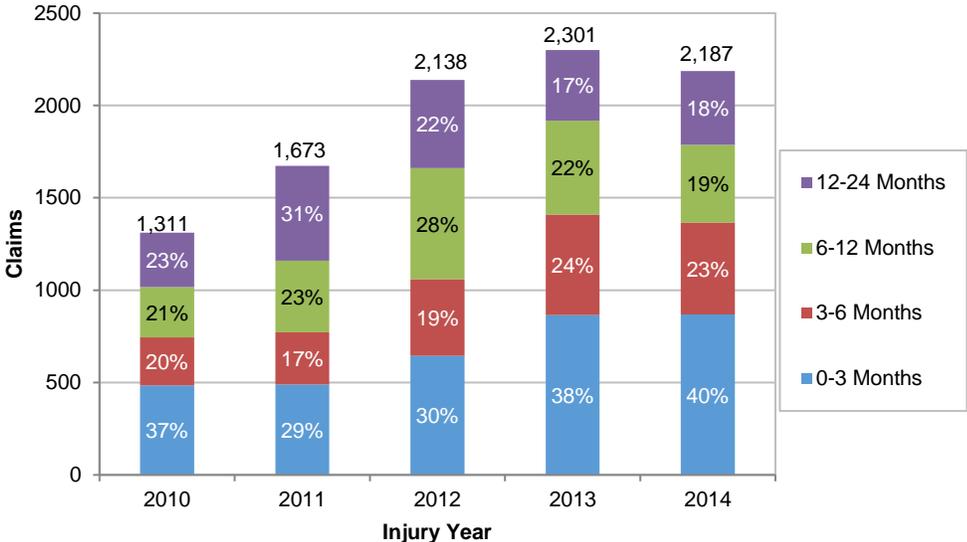
Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

TIME OF FIRST USE

About 40 percent of the claims receiving compounded drugs received the first compounded drug within the first three months after injury (see Figure 16). 23 percent of the claims received the first compounded drugs between 3 to 6 months from injury. For the remaining 37 percent of the claims, compounded drugs were first prescribed 6 months or more after injury, including those claims (18 percent) that received compounded drugs for the first time after a year or more since injury.

Among the 40 percent of the claims that received compounded drugs within 3 months of injury in IY 2014, 60 percent of them used non-compounded drugs prior to receiving compounded drugs (see Table 7). In other words, 40 percent of them received compounded drugs as their first pharmacy service.

Figure 16: Date of Injury to Date of First Use of Compounded Drugs by Claim, by Injury Year at 24 Months of Maturity



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

Table 7: Share of Claims Having Other Drugs Prior to Using Compounded Drugs, by Time of First Use, by Injury Year at 24 Months of Maturity

Injury Year	Time of First Use			
	0-3 Months	3-6 Months	6-12 Months	12-24 Months
2010	66%	89%	90%	94%
2011	63%	85%	93%	95%
2012	61%	85%	89%	95%
2013	63%	80%	85%	92%
2014	60%	83%	87%	92%

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

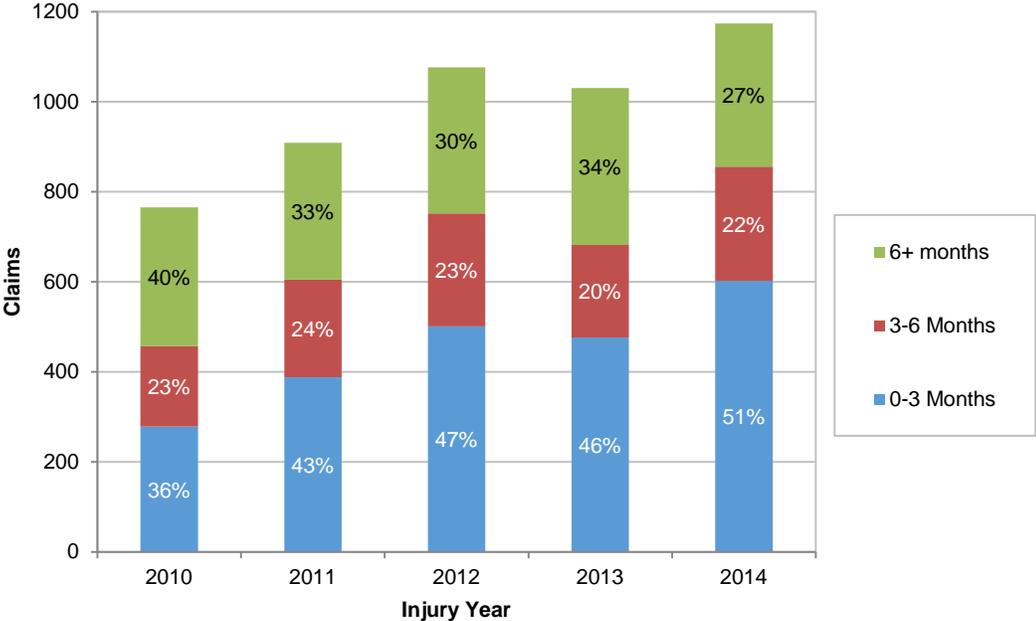
DURATION

A ‘short term’ may be defined from ‘one to two weeks’ to ‘3 to 6 months’ depending on the type of injury. In many definitions, any pain that lasts longer than 6 months are considered to be chronic. We calculated how long each claim used compounded drugs by counting the number of days between the first and last prescription dates of compounded drugs. Technically, the last day of use will depend on the length of drug days of the last prescription. However, we simply use the prescription date because of some data irregularities in drug days reported.

Only considering those claims with multiple compounding drug service dates in IY 2014 (54 percent in Figure 15), about half of the claims received multiple compounded drug prescriptions within a period of

3 months. 22 percent received for a period of 3 to 6 months. 27 percent of the claims used compounded drugs for longer than 6 months.

Figure 17: Duration of Compounded Drug Usage, by Injury Year at 24 Months of Maturity



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

6. BASES OF COMPOUNDED DRUGS

'Bases' in a compounded drug prescription consist of solvents, emulsifiers, surfactants, cream bases, liquid vehicles, and other chemicals and excipients that are added to active ingredients to alter the drug's dosage form or the route of administration. They act as fillers, binders, disintegrants, lubricants, coloring agents, and preservatives.

A relatively small number of base ingredients accounted for the majority of bases' bill lines and cost. The top 20 most common bases used in compounded drugs (see Table 8) accounted for 89 percent of all base bill lines and 77 percent of total base cost.

Most of the top 20 bases in Table 8 correspond to the most commonly used base ingredients in cream-based formulas. These ingredients are combined to create a penetration enhancer for topical uses. Isopropyl palmitate, ethyl alcohol, and/or ethoxy diglycol are solvents used to dissolve lecithin, which is a natural emulsifier. The resulting product is commonly called 'lipoil'. Poloxamer (or Pluronic) is a polymer gel base. Poloxamer and lipoil are mixed (also known as PLO – 'Pluronic Lecithin Organogel') and these are combined with one or more active ingredients. Sorbic acid and potassium sorbate are added as preservatives.

Table 8: List of Top 20 Bases by Number of Bill Lines, 2010–2016

Rank	Base Name	Number of Bill Lines	Total Pay	Pay per Line
1	ETHOXY LIQ DIGLYCOL	19,784	\$276,074	\$14
2	VERSAPRO CREAM	16,791	\$1,686,380	\$100
3	SALT STABLE CRE LS ADV	8,165	\$1,684,204	\$206
4	POLOXAMER POW 407	7,967	\$28,014	\$4
5	LECITHIN SOY GRA	7,722	\$7,247	\$1
6	ISOPROPYL LIQ PALMITATE	7,602	\$6,403	\$1
7	POTASSIUM POW SORBATE	7,506	\$48,557	\$6
8	ALCOHOL SOL 100%	7,398	\$21,113	\$3
9	SORBIC ACID POW	7,337	\$1,578	\$0
10	PCCA LIPODER CRE BASE	6,954	\$1,036,790	\$149
11	PROPYLENE LIQ GLYCOL	6,841	\$28,261	\$4
12	POLOXAMER POW 188	4,763	\$25,101	\$5
13	PCCA CUSTOM CRE LIPO-MAX	4,744	\$1,113,384	\$235
14	BACTER WATER INJ BENZ ALC	4,318	\$32,114	\$7
15	PROPYLENE GL SOL	3,825	\$30,519	\$8
16	ETHYL ALCOHO SOL 100%	3,679	\$6,335	\$2
17	PCCA LECITHI SOL ISOPROPY	2,977	\$37,112	\$12
18	ETHYL ALCOHO SOL 95%	1,839	\$5,059	\$3
19	EUCALYPTUS OIL	1,612	\$3,848	\$2
20	DIMETHYL SOL SULFOXIDE	1,533	\$19,295	\$13

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

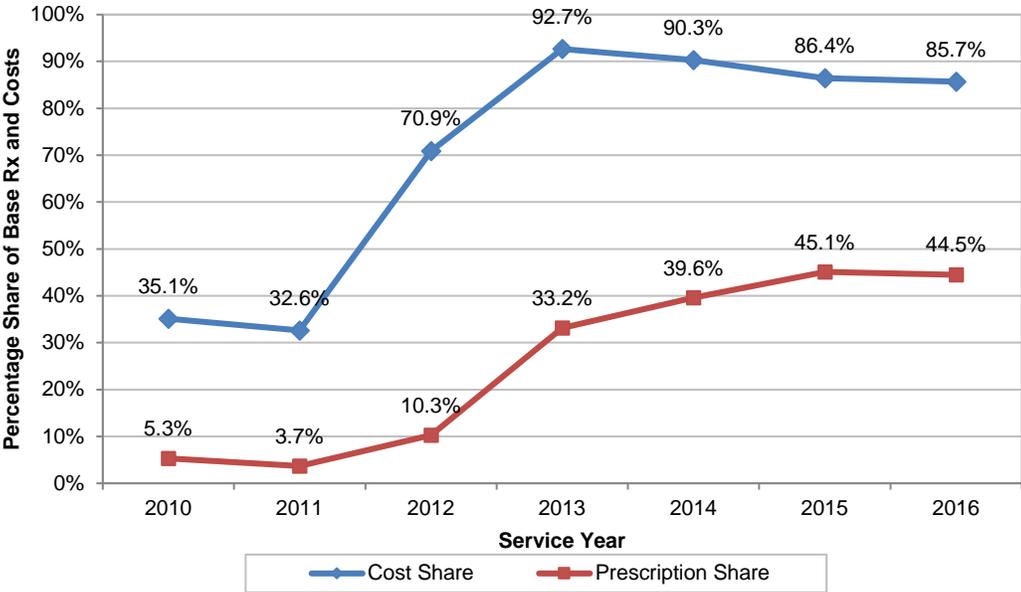
Per-line cost of these ingredients are generally less than \$10. More expensive ingredients such as VersaPro, Salt Stable LS Advanced, and Lipoderm are proprietary versions of cream or gel base. To a certain extent, these are a convenient substitute for preparing and mixing several ingredients into a PLO base.

USE OF PROPRIETARY BASES

Many of the identified compounded drug bills did not include any base. This may indicate that there are some difficulties in separating and billing for individual base ingredients in a complex compounding process. A common topical cream base (PLO based) prescription includes six or more base ingredients: Poloxamer, lecithin, isopropyl palmitate, sorbic acid, ethyl alcohol, and potassium sorbate. For each of these ingredients, dispensing pharmacies have to calculate the amount and charge. Such difficulties may encourage the use of convenient, but more expensive, proprietary bases, which are manufactured specialty bases being sold as an alternative to traditional mixing of PLO bases. They are also marketed as providing convenient and efficient compounding and enhancing efficacy in delivering topical products.

The increased use of proprietary bases is noticeable in Figure 18 that shows cost and prescription shares of the top 12 most used proprietary bases. These are all cream bases for topical application, and consist of VersaPro, PCCA Lipoderm, PCCA Custom Lipo-Max, PCCA Poloxamer, Salt Stable LS Advanced, PracaSil Plus, Transdermal Pain Base, Pentravan, Versatile, Lipopen, Panderm, and TeroDerm. In 2010, these proprietary cream bases accounted for 5.3 percent of base prescriptions and 35 percent of the base cost. By 2016, they accounted for about 45 percent of prescriptions and 86 percent of the total cost of bases.

Figure 18: Prescription and Cost Shares of Top 12 Proprietary Bases



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

The type of base such as gel, cream, or liquid may indicate the route of administration of the compounded drugs. Our data, however, does not specify whether a prescription is a compounded drug or not, and lacks specific information regarding the route of administration of the finished compounded drug. Furthermore, about half of the prescriptions have not separated the bases from active ingredients, making it difficult to characterize their final route of administration. Nevertheless, more than 95 percent of the identified bases are associated with cream or gel bases, indicating that most of the compounded drugs are for topical use.

7. ACTIVE INGREDIENTS OF COMPOUNDED DRUGS

All bill lines, except for those identified as bases, or unidentified, are considered to be active pharmaceutical ingredients (APIs). The number and type of APIs in compounded drugs are limited to a few select ingredients. In 2016, out of 52,546 bill lines containing APIs, the top 20 ingredients accounted for 93 percent of the bill lines and 93 percent of the cost (see Table 9).

The most common APIs were neuromuscular drugs (Baclofen, Gabapentin, and Cyclobenzaprine). Baclofen was the most common ingredient in 2016, being included in 38 percent of all compounded drug prescriptions. Gabapentin and Cyclobenzaprine were used in 31 percent and 24 percent of compounded drugs, respectively. Next common ingredients were Flurbiprofen (analgesic NSAID), Amitriptyline (antidepressant), and Bupivacaine (local anesthetic agent).

Table 9: Most Common Active Pharmaceutical Ingredients in Compounded Drugs (2016)

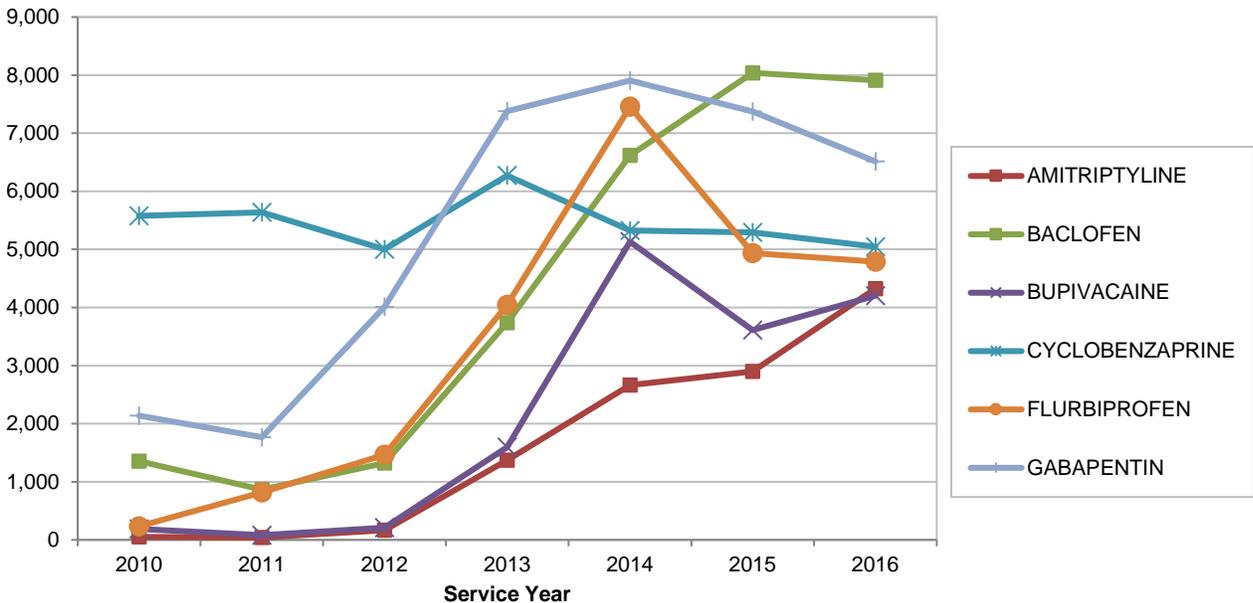
Rank	Drug Description	Number of Bill Lines	Total Pay	Share of Prescriptions Containing the Ingredient
1	BACLOFEN POW	7,986	\$1,294,827	38.1%
2	GABAPENTIN POW	6,604	\$1,775,113	31.4%
3	CYCLOBENZAPRINE POW HCL	5,103	\$682,450	24.3%
4	FLURBIPROFEN POW	4,844	\$1,473,704	23.1%
5	AMITRIPTYLINE POW HCL	4,351	\$310,039	20.8%
6	BUPIVACAINE POW HCL	4,282	\$165,303	20.3%
7	AMANTADINE POW HCL	3,428	\$320,062	16.3%
8	KETOPROFEN POW	3,076	\$520,989	14.7%
9	TRAMADOL HCL POW	1,979	\$383,830	9.5%
10	MELOXICAM POW	1,570	\$65,593	7.6%
11	MENTHOL CRY	1,402	\$4,614	6.7%
12	LIDOCAINE POW HCL	1,106	\$18,521	5.3%
13	CLONIDINE POW	889	\$18,205	4.2%
14	RELYYT DIS 0.025-5%	431	\$268,156	2.0%
15	SYNVEXIA PAD 4-1%	368	\$720,095	1.7%
16	MEFENAMIC POW ACID	299	\$25,760	1.4%
17	MELOXICAM TAB 15MG	268	\$26,521	1.2%
18	FLUTICASONE POW PROPIONA	261	\$362,500	1.2%
19	NEW TEROGIN LOT	260	\$68,930	1.2%
20	LIDOCAINE POW	258	\$2,039	1.2%
Subtotal		48,765	\$8,507,251	
Total Active Ingredients		52,546	\$9,198,646	

Note: The sum of share of prescriptions exceed 100 percent since multiple ingredients may be included in one prescription.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

The use of top 6 ingredients increased significantly since 2011 (see Figure 19). After the pharmacy closed formulary, some ingredients such as topical Ketamine, which is an “N” drug in the pharmacy closed formulary, and Ibuprofen decreased substantially, while Baclofen increased from 1,355 in 2010 to 7,910 in 2016. Gabapentin, Flurbiprofen, Bupivacaine, and Amitriptyline also increased significantly. Cyclobenzaprine stayed at about the same level of use.

Figure 19: Number of Active Ingredients by Service Year



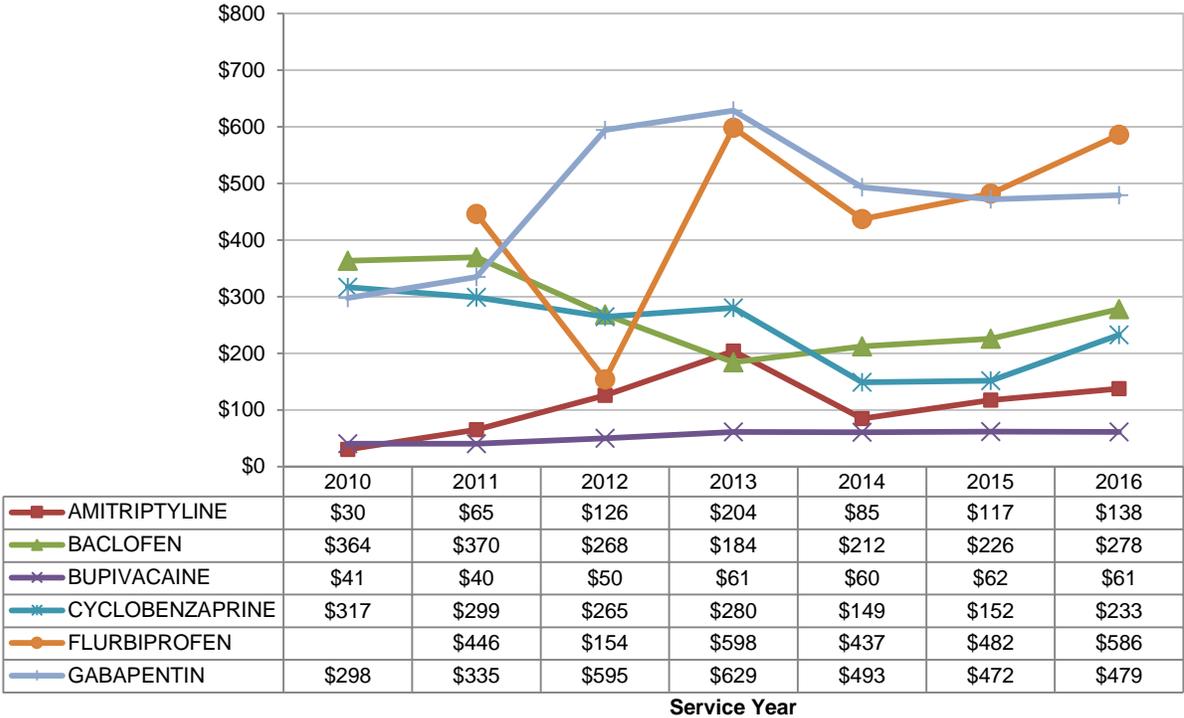
Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

COST BY INGREDIENT

Each ingredient comes in a different package with different number of units from different manufacturers. Bill lines included a variable for the total number of units (such as number of pills or grams), but this quantity varied greatly even for the same NDC code, perhaps due to billing and data errors. This poses some difficulties in calculating an average cost per ingredient. To simplify, we use a simple per-prescription average cost excluding some extreme values.

Figure 20 shows the average cost per prescription for the top 6 most common ingredients. The average cost of Amitriptyline increased the most from \$30 to \$138 (353 percent). That of Gabapentin and Bupivacaine increased by 61 percent and 52 percent, respectively. Flurbiprofen increased by 31 percent (since 2011) while the average price of Cyclobenzaprine and Baclofen decreased by 27 percent and 24 percent, respectively. Compounded drugs in 2016 contained more active ingredients per prescription than in 2010, which contributed to the increasing cost per prescription.

Figure 20: Cost per Prescription of Selected Active Ingredients



Note: Extreme value because of a small number of observations was omitted for Flurbiprofen in 2010. Drug units and quantities billed per prescription differed across different packages, manufacturers, and service years. As a result, average costs were calculated per prescription without considering any changes in the amount of ingredients being used per prescription. A decrease or an increase in the average cost per ingredient may be affected by a systematic decrease or increase in the ingredient’s per-prescription unit.

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

8. COMPOUNDED DRUGS BY N-DRUG STATUS AND OPIOIDS

Compounded drug prescriptions that contained one or more of status “N” drugs are subject to preauthorization according to the pharmacy closed formulary. However, identifying “N” drugs in the compounded drugs is difficult. For example, three of the common active ingredients in compounded drugs (Clonidine, Piroxicam, and Diclofenac) are status “N” drugs. Nevertheless, online queries of NDC codes of powder forms of these drugs do not produce any results. Furthermore, topical applications of Ketamine, Lidocaine, and Capsaicin are “N” drugs, but NDCs of powder forms of these drugs are not listed as “N” drugs in the online query or in the downloaded database. To counter this problem, we used generic names of the most common ingredients to determine the “N” drug status of each billing line.

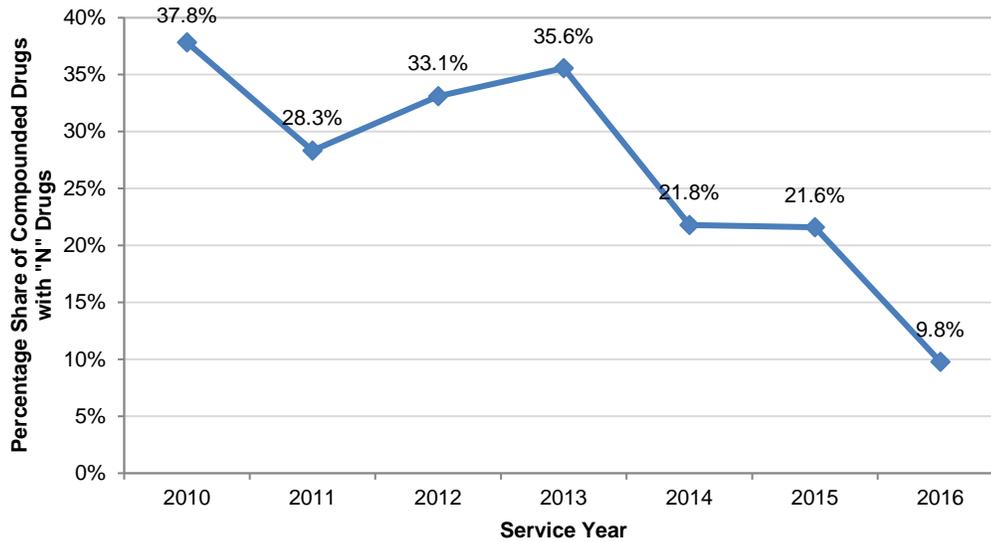
In 2010, about 38 percent of the compounded drug prescriptions contained status “N” drugs (see Table 10 and Figure 21). This share decreased to about 10 percent in 2016. In terms of bill lines, about 25 percent of bill lines were “N” drugs in 2010, which decreased to about 5 percent in 2016. Because a compounded drug prescription includes multiple ingredients and bill lines, “N” drugs accounted for 10 percent of prescriptions while they accounted for only 5 percent of the bill lines. Unlike other active ingredients, compounded drugs rarely included more than one “N” drug. After the pharmacy closed formulary of September 2011, the share of N-drugs decreased significantly, but the most noticeable decrease occurred after 2014 when legacy claims became subject to the closed formulary since legacy claims received the majority of pharmacy services.

Table 10: N-drugs in Compounded Drugs at Bill Line and Prescription Levels

Service Year	By Bill Line			By Prescription		
	N-drugs	Others	N-drug Share	N-drugs	Others	N-drug Share
2010	8,335	25,333	24.8%	6,462	10,618	37.8%
2011	7,629	26,156	22.6%	4,628	11,704	28.3%
2012	9,787	33,075	22.8%	5,939	11,992	33.1%
2013	10,333	42,827	19.4%	7,486	13,567	35.6%
2014	7,288	58,883	11.0%	5,165	18,533	21.8%
2015	6,536	54,109	10.8%	4,170	15,147	21.6%
2016	2,510	50,036	4.8%	1,876	17,335	9.8%

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

Figure 21: Share of Compounded Drug Prescriptions Containing Status “N” Drugs



Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

COMPOUNDED DRUGS WITH OPIOIDS

Some opioids such as Oxycodone and Fentanyl are status “N” drugs in the pharmacy closed formulary, but common opioids such as Hydrocodone/APAP and Tramadol are not. The share of compounded drug prescriptions with opioids increased rapidly from about 6 percent in 2010 to 16 percent in 2014. In terms of cost, they accounted for 7 percent in 2010 but increased to 16 percent in 2014. Most of these compounded drugs contained Hydrocodone combination products until 2013. Since 2013 the most common opioids were Tramadol. The use of opioids in compounded drugs decreased steadily since 2014, in part because Tramadol became a Schedule IV controlled substance since July 2014. In 2016, 10 percent of compounded drug prescriptions contained opioids, which accounted for 9 percent of the total cost.

Table 11: Share of Compounded Drug Prescriptions with Opioids

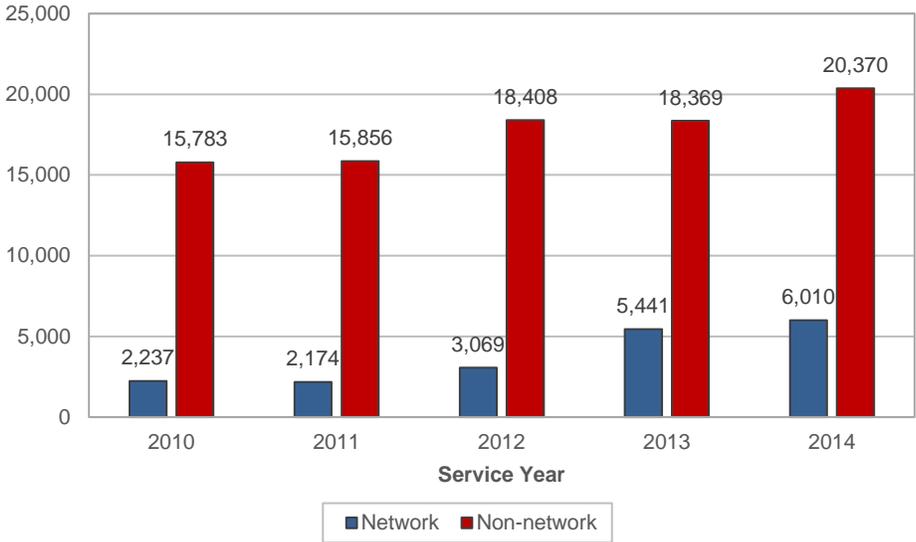
Service Year	Number of Rx with Opioids	Number of Rx w/o Opioids	Share of Rx with Opioids	Cost of Rx with Opioids	Cost of Rx w/o Opioids	Cost Share of Rx with Opioids
2010	1,158	16,862	6.4%	\$396,075	\$5,410,286	6.8%
2011	959	17,071	5.3%	\$325,661	\$5,609,903	5.5%
2012	892	20,585	4.2%	\$413,772	\$8,732,839	4.5%
2013	1,113	22,697	4.7%	\$758,495	\$12,133,823	5.9%
2014	4,182	22,198	15.9%	\$2,293,288	\$11,673,887	16.4%
2015	2,542	18,610	12.0%	\$1,591,285	\$10,452,822	13.2%
2016	2,115	18,636	10.2%	\$1,040,143	\$10,202,721	9.3%

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

9. COMPOUNDED DRUGS BY NETWORK STATUS

In 2014, 6,010 (23 percent of the total) prescriptions for the compounded drugs were used by network claims (see Figure 22). In comparison, the share of network claims in all pharmacy services was 45 percent in 2014, indicating that fewer network claims were receiving compounded drugs than non-network claims. However, since 2011, the number of compounded drugs increased more rapidly in networks (by 176 percent) than in non-network (by 28 percent).

Figure 22: Number of Compounded Drugs by Network Status



Note: Network claims lists are available up to 2014.

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

Comparing with the total unique claim numbers in all pharmacy data, network claims receiving compounded drugs represented 2.1 percent of all network claims in 2014 (see Table 12). For non-network claims, 4.2 percent of them received at least one compounded drug.

Table 12: Number and Share of Claims Receiving Compounded Drugs by Network Status

Service Year	Number of Claims (Networks)	Number of Claims (Non-network)	Share of Total Claims (Networks)	Share of Total Claims (Non-network)
2010	392	2,713	0.8%	2.3%
2011	434	2,349	0.8%	2.3%
2012	763	2,934	1.3%	3.1%
2013	1,413	3,612	2.3%	4.4%
2014	1,314	3,160	2.1%	4.2%

Source: Texas Department of Insurance, Workers’ Compensation Research and Evaluation Group, 2017.

10. PROVIDERS, PHARMACIES, AND INSURANCE CARRIERS

DISPENSING PHARMACIES

For dispensing pharmacies, top 5 pharmacies accounted for 73 percent of all compounded drug prescriptions in 2010, which decreased to 65 percent in 2013 (see Table 13). However, their share increased to 86 percent in 2016.

Table 13: Prescription Number and Share of Top 7 Dispensing Pharmacies

Service Year	2010	2011	2012	2013	2014	2015	2016
Total Number of Compounded Drug Prescriptions	18,020	18,030	21,477	23,810	26,380	21,152	20,751
Rx by Top 5 Pharmacies	13,216	13,968	16,332	15,551	18,036	12,653	17,736
Share of Top 5 Pharmacies	73.3%	77.5%	76.0%	65.3%	68.4%	59.8%	85.5%

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

PRESCRIBING HEALTH CARE PROVIDERS

Compounded drugs are mostly prescribed by medical doctors (MD/DO type) (see Table 14). Since 2010, more than 90 percent of the prescribers were medical doctors. The decrease in the number of unidentified prescribers is mainly due to a better quality of data submitted to TDI-DWC.

Table 14: Number of Compounded Drug Prescriptions by Prescribing Health Care Provider Type

Type of Prescribing HCP	2010	2011	2012	2013	2014	2015	2016
DC*		16	126	143	107	264	72
MD/DO	16,769	16,687	19,133	22,397	24,918	19,651	19,436
PA/NP	77	124	374	468	430	467	251
Other	93	178	192	292	633	561	752
Unidentified	1,081	1,025	1,652	510	292	209	240
Total	18,020	18,030	21,477	23,810	26,380	21,152	20,751
Share of unidentified	6.0%	5.7%	7.7%	2.1%	1.1%	1.0%	1.2%
Share of MD/DO	93.1%	92.6%	89.1%	94.1%	94.5%	92.9%	93.7%

Note: Those reported as DC are mostly likely practicing as prescribing nurse practitioners.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

In 2016, top10 prescribers accounted for 55 percent of all prescriptions (see Table 15). This represented a slight decrease from 67 percent in 2010. About 68 percent of all compounded drug prescriptions were provided by the top 20 prescribers in 2016, and about 90 percent of compounded drug prescriptions were provided by the top 100 HCPs. Total number of identified prescribers was 517 in 2016.

Table 15: Number of Compounded Drug Prescriptions by Prescribing Health Care Providers

Prescribing HCP by Rank	2010	2011	2012	2013	2014	2015	2016
Top 10 Prescribers	11,423	11,767	11,405	10,593	13,456	9,848	11,178
Top 10 Share	67.4%	69.2%	57.5%	45.5%	51.6%	47.0%	54.5%
Top 20 Prescribers	13,266	13,452	13,604	13,821	17,095	13,808	14,000
Top 20 Share	78.3%	79.1%	68.6%	59.3%	65.5%	65.9%	68.3%
Top 100 Prescribers	15,882	15,976	17,653	19,173	22,892	18,784	18,405
Top 100 Share	93.8%	93.9%	89.0%	82.3%	87.7%	89.7%	89.7%
Number of Identified HCPs	388	417	618	893	781	621	517
Total Compounded Drug Rx	16,939	17,005	19,825	23,300	26,088	20,943	20,511

Note: Prescriptions without prescriber's identification were excluded from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

INSURANCE CARRIERS

Top 10 insurance carriers in 2016 accounted for about 80 percent of all compounded drug prescriptions and 76 percent of all cost (see Table 16). Denial rate of the top 10 insurance carriers was similar to the overall denial rate of 34 percent, but individually the denial rate varied widely, ranging from 16 percent to 67 percent per carrier. The average cost per prescription was \$782, slightly lower than the overall \$829, but the average cost among the top 10 carriers ranged from a low of \$371 per prescription to a high of \$1,224 per prescription.

Compounded drugs accounted for 3.6 percent of all pharmacy services on average for top 10 carriers, slightly higher than the overall compounded drug share of 3.2 percent. However, compounded drug shares differed widely among the top 10 carriers, ranging from a high of 9.3 percent to a low of 1.3 percent.

Table 16: Number of Compounded Drug Prescriptions by Top 10 Insurance Carriers (2016)

	Number of Compounded Drugs	Number of Denied Rx	Denial Rate	Total Cost	Cost per Rx	Number of Rx in All Pharmacy	Share of Compounded Drugs in All Pharmacy
Top 10 Insurance Carriers	16,508	5,558	33.7%	\$8,567,716	\$782	457,330	3.6%
Total Compounded Drugs	20,751	7,195	34.7%	\$11,242,865	\$829	651,811	3.2%
Share of Top 10 Carriers	79.6%	77.2%		76.2%		70.2%	

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

11. COMPOUNDED DRUGS BY GEOGRAPHICAL AREA

To investigate geographical differences in the usage of compounded drugs, we assigned a hospital referral region (HRR) for each compounded drug prescription using the injured employee's mailing address. About one percent of the prescriptions had an out-of-state address and these were excluded. Boundaries of HRRs are developed by *Dartmouth Atlas of Health Care* and based on the pattern of referrals for major surgeries using Medicare data.

Houston HRR accounted for 67 percent of all compounded drugs in 2016 (see Table 17). Considering all pharmacy prescriptions, Houston's share was 24 percent. Dallas and Fort Worth areas were the second highest in compounded drug use with a combined 14.5 percent of compounded drugs. However, in all pharmacy, their share was 31.2 percent. Houston HRR was the single most important area for compounded drug use. Data also shows that top prescribers and dispensing pharmacies are also located in the Houston area.

Table 17: Compounded Drug Prescriptions by HRR, 2016

HRR	Compounded Drugs		All Pharmacy Prescriptions	
	Number of Prescriptions	Prescription Share	Number of Prescriptions	Prescription Share
Abilene	48	0.2%	10,028	1.6%
Amarillo	160	0.8%	8,618	1.4%
Austin	148	0.7%	33,987	5.4%
Beaumont	709	3.5%	10,822	1.7%
Bryan	38	0.2%	5,102	0.8%
Corpus Christi	190	0.9%	13,087	2.1%
Dallas	1,952	9.6%	121,279	19.3%
El Paso	192	0.9%	26,217	4.2%
Fort Worth	1,006	4.9%	74,534	11.9%
Harlingen	139	0.7%	12,525	2.0%
Houston	13,665	66.9%	148,314	23.6%
Longview	15	0.1%	4,617	0.7%
Lubbock	156	0.8%	15,873	2.5%
McAllen	104	0.5%	12,458	2.0%
Odessa	380	1.9%	14,668	2.3%
San Angelo	89	0.4%	4,333	0.7%
San Antonio	893	4.4%	69,649	11.1%
Temple	87	0.4%	8,218	1.3%
Tyler	164	0.8%	15,095	2.4%
Victoria	131	0.6%	3,966	0.6%
Waco	124	0.6%	8,880	1.4%
Wichita Falls	30	0.1%	4,910	0.8%
Total	20,420	100.0%	627,180	100.0%

Note: Prescriptions without HRR information are removed from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

A high utilization of compounded drugs may occur because claims are receiving higher-than-average prescriptions per claim, or because a higher number of claims are receiving compounded drug prescriptions. Table 18 shows that Houston HRR also had an above-average share of claims receiving compounded drugs. 47 percent of the claims receiving compounded drugs in 2016 were from Houston HRR when it accounted for 22 percent of all pharmacy claims. Houston, Dallas and Fort Worth HRRs together accounted for 73 percent of all claims receiving compounded drugs. In Houston, the average number of compounded drug prescriptions per claim was also high at 10 prescriptions per claim.

About 5.4 percent of the claims in Houston HRR (1,403 out of 25,946 in Table 18) received one or more compounded drugs in 2016, being the highest utilization area for compounded drugs. The second most utilization area was Dallas HRR with 2.3 percent of the claims receiving compounded drugs. Fort Worth (1.7 percent of the claims), San Antonio (1.5 percent) and Austin (0.6 percent) HRRs had relatively low use of compounded drugs.

Table 18: Number of Claims Receiving Compounded Drugs by HRR, 2016

HRR	Compounded Drugs			All Pharmacy Prescriptions		
	Number of Claims	Rx per Claim	Claim Share	Number of Claims	Rx per Claim	Claim Share
Abilene	15	3	0.5%	1,374	7	1.2%
Amarillo	37	4	1.2%	1,491	6	1.3%
Austin	49	3	1.6%	7,617	4	6.5%
Beaumont	70	10	2.3%	1,439	8	1.2%
Bryan	9	4	0.3%	984	5	0.8%
Corpus Christi	43	4	1.4%	2,562	5	2.2%
Dallas	543	4	18.0%	23,880	5	20.2%
El Paso	36	5	1.2%	5,593	5	4.7%
Fort Worth	244	4	8.1%	14,103	5	11.9%
Harlingen	34	4	1.1%	3,200	4	2.7%
Houston	1,403	10	46.6%	25,946	6	22.0%
Longview	5	3	0.2%	654	7	0.6%
Lubbock	41	4	1.4%	2,695	6	2.3%
McAllen	30	3	1.0%	3,307	4	2.8%
Odessa	113	3	3.8%	1,802	8	1.5%
San Angelo	7	13	0.2%	646	7	0.5%
San Antonio	205	4	6.8%	13,950	5	11.8%
Temple	19	5	0.6%	1,914	4	1.6%
Tyler	33	5	1.1%	1,915	8	1.6%
Victoria	20	7	0.7%	640	6	0.5%
Waco	46	3	1.5%	1,616	5	1.4%
Wichita Falls	9	3	0.3%	706	7	0.6%
Total	3,011	7	100.0%	118,034	5	100.0%

Note: Prescriptions without HRR information are removed from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

12. COMPOUNDED DRUGS BY AGE AND GENDER

Table 19 presents the number of prescriptions by age group for compounded drugs and all non-compounded drugs. The average age at the time of prescription was 47.8 years for injured employees with compounded drugs and 48.0 years for injured employees with non-compounded drugs. Compounded-drug users were slightly more numerous among 30 to 59 age groups. But the difference in age distribution between compounded and non-compounded-drug users was minor.

Table 19: Number of Prescriptions by Age Group, 2010–2016

Age Group	Compounded Drugs		Non-compounded Drugs	
	Number of Rx	Share	Number of Rx	Share
Under 20	183	0.1%	20,712	0.3%
20-29	7,943	5.3%	402,898	6.5%
30-39	23,058	15.4%	911,577	14.8%
40-49	43,591	29.2%	1,667,075	27.0%
50-59	52,203	34.9%	2,080,791	33.7%
60 and Over	22,514	15.1%	1,082,808	17.6%
Total	149,492	100.0%	6,165,861	100.0%

Note: Prescription without age information are removed from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.

In terms of gender, more compounded drug prescriptions were for males (62 percent) than for females (38 percent) (see table 20). However, that is due to the fact that there are more male claims than female claims. Given their relative shares between compounded and non-compounded drugs, females were slightly more likely to use compounded drugs. For females, compounded drug users were 4.8 percentage points higher while for males compounded drug users were 4.8 percentage points lower. About 15 percent of the bills did not have information about gender and these were excluded from this analysis.

Table 20: Number of Prescriptions by Gender, 2010–2016

Gender	Compounded Drugs		Non-compounded Drugs	
	Number of Rx	Share	Number of Rx	Share
Female	47,564	38.4%	1,657,083	33.6%
Male	76,301	61.6%	3,269,586	66.4%
Total	123,865	100.0%	4,926,669	100.0%

Note: Prescription without gender information are removed from analysis.

Source: Texas Department of Insurance, Workers' Compensation Research and Evaluation Group, 2017.



Baseline Evaluation of the Utilization and Cost Patterns of Compounded Drugs, 2017

Texas Department of Insurance, Workers' Compensation Research and Evaluation Group